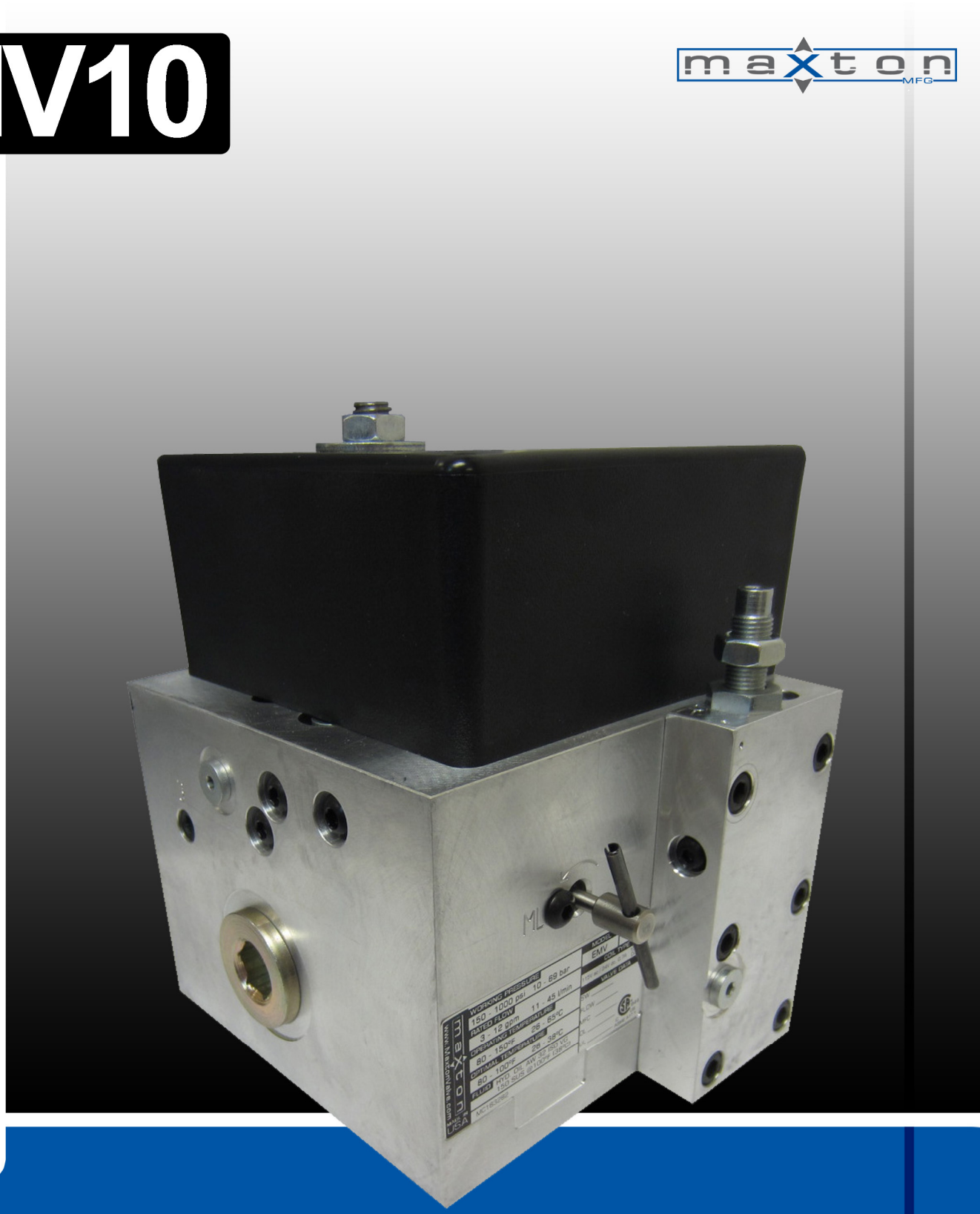
EMV10

Electronic Motor Valve



USER MANUAL

Installation - Setup - Technical Data

Maxton Manufacturing Company - 1728 Orbit Way - Minden - Nevada - 89423-4114 - Ph: 775-782-1700 - Fax: 775-782-1701 - Email: info@maxtonvalve.com - Web: www.maxtonvalve.com

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IMPORTANT SAFEGUARDS

Read Instructions: All Safety, installation, and setup instructions should be read before installing or operating the EMV10 Electronic Motor Valve. Failure to follow the installation and setup instruction may result in unsatisfactory performance, equipment damage, or physical injury.

1. **Service:** There are no user serviceable parts contained herein. Refer all service to qualified service personnel only.
2. **Risk of Electrical Shock:** Do not remove the valve cover except when making adjustments or servicing the valve. Always turn off all electrical power sources before servicing any mechanical part or assembly. Do not place metal objects in contact with the energized Electronic Control Board at any time.
3. **EMV10 Power Sources**: The EMV10 Electronic Motor Valve uses multiple electrical power sources. Hazardous voltages may be present even if one source to the EMV10 is secured. Verify all voltage sources to the EMV10 are secured before making repairs.
4. **Wiring:** All wiring should be routed in such a way that it is not likely to be pulled, pinched, stepped on, have objects placed on it, or damaged in any way.
5. **Retain User Manual:** The user manual should be retained for future reference.

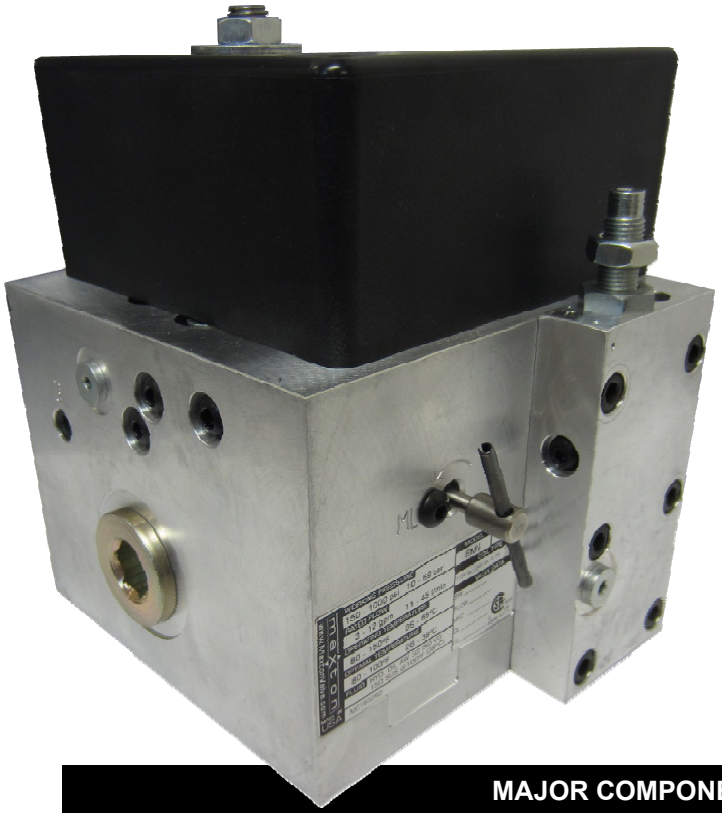
INTRODUCTION AND FEATURES

The Maxton **EMV10** Electronic Motor Valve was designed to meet a growing demand for low use limited access (LULA), handicapped and residential hydraulic elevator applications. The EMV10 combines hydraulic and electronic control to provide excellent ride quality. The EMV10 has all the features found in a commercial hydraulic control valves plus electronic safety control and adjustments allowing quick set up and easy problem analysis.

FEATURES

- Quick set up and less field adjustments required.
- Built in pressure and viscosity compensation.
- Ride performance is maintained from empty to fully loaded condition.
- Acceleration and deceleration are independent of load and oil viscosity.
- Regulated contract down speed, up leveling speed and down leveling speed.
- Stabilized leveling speed is achieved in a very short distance.

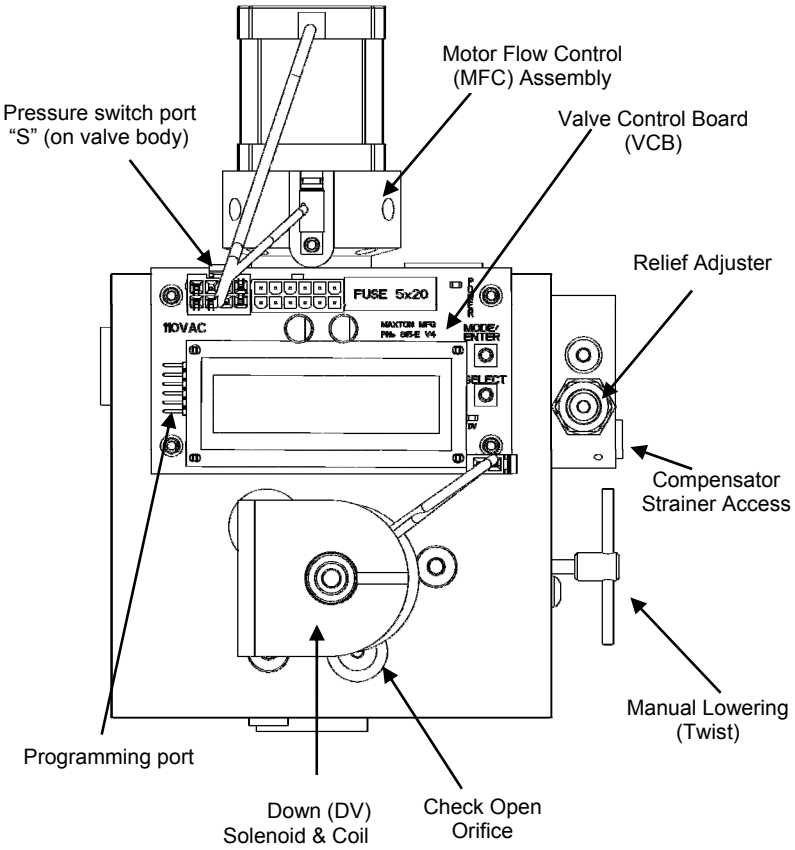
EMV10

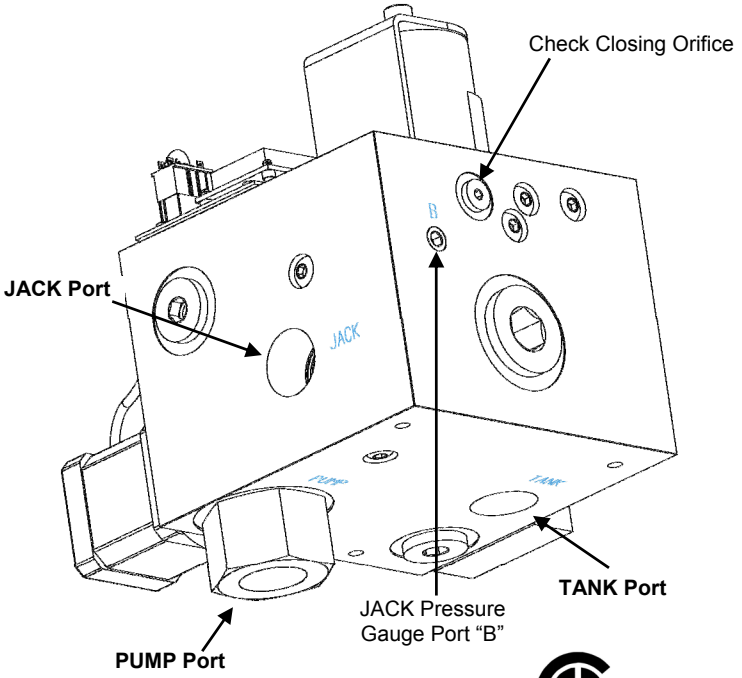


SPECIFICATIONS

	STANDARD	METRIC
Flow Range	3 - 12 gpm	11 - 45 lpm
Operating Pressure		
Min	150 psi	10 bar
Max	1000 psi	69 bar
Line Ports	3/4" NPT	
Gauge Ports "B"	1/8" NPT	
Pressure Port "S"	1/8" NPT	
Operating Temperature	80 - 150ºF	26 - 65ºC
Oil Type	Hydraulic ISO VG 32 150 SUS @ 100ºF or equivalent biodegradable oil	
Electrical Input Provided by Elevator Contractor		
Valve Controller Power Supply		+24 VDC 3.2A (Regulated)
Pump Disable Circuit		+110 VAC
Coil Input Signals		+110 VAC
Overall Dimensions:		
Width:	5-7/8"	149.2 mm
Height:	7 9/16"	192.1 mm
Depth:	8"	203.2 mm
Weight:	14 lbs.	6.4 kg.

MAJOR COMPONENTS & PORT LOCATIONS





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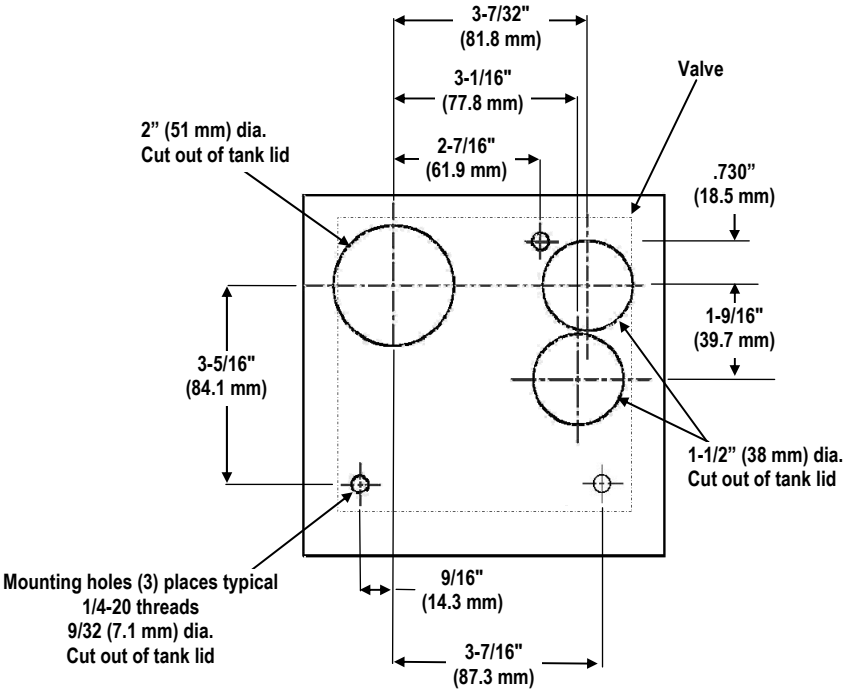
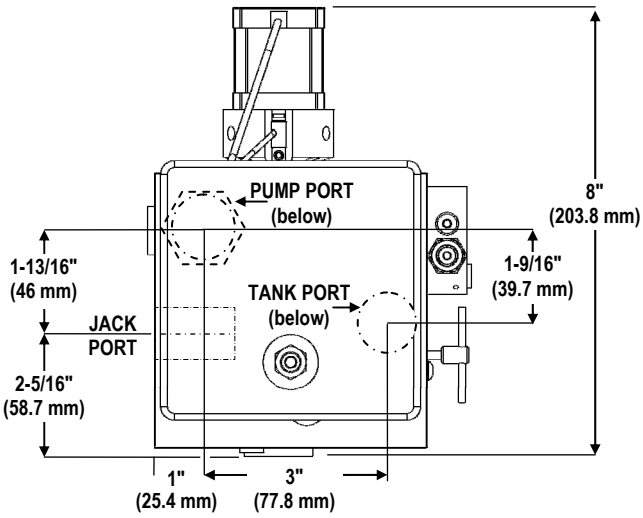
1728 ORBIT WAY - MINDEN - NEVADA - 89423-4114 - PHONE: 775-782-1700 - FAX: 775-782-1701 - WEB: maxtonvalve.com - EMAIL: info@maxtonvalve.com

PORT LOCATIONS:

Use pipe or hose fittings with the following port locations as shown:

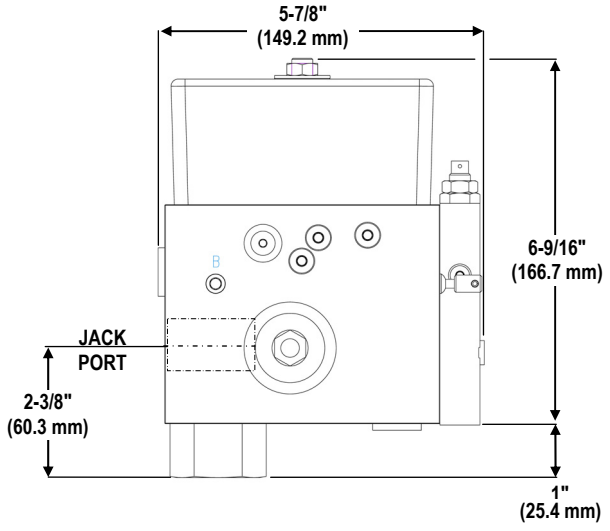
Pump: ¾" NPT Jack: ¾" NPT Tank: ¾" NPT





MOUNTING HOLES GUIDELINE: TOP VIEW

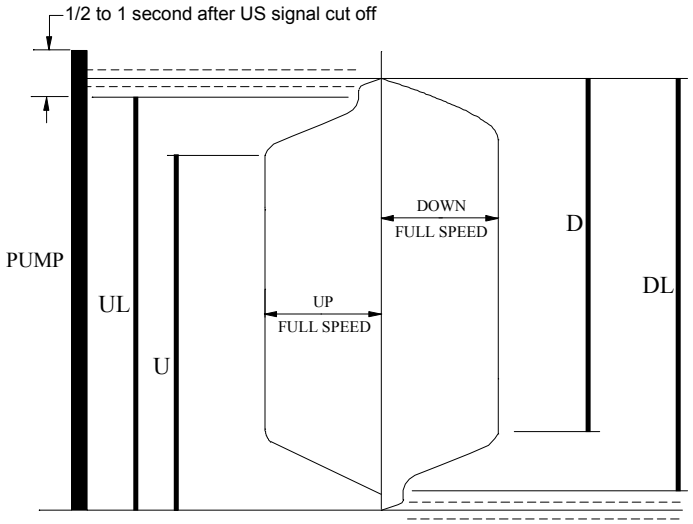
The dimensions above are for the cutout and hole pattern if the valve is mounted on the tank lid.



CONTROL SIGNAL SEQUENCE

Installer to provide U, UL, D, and DL signals from main elevator controller to VCB (Valve Control Board).

- **UL:** For up travel, turn on at pump start, turn off to stop. With UL signal on and pump running, car moves up at leveling speed. For "soft stop" pump should run about one half second after UL signal is turned off.
- **U:** Turn on with UL to run up at contract speed. Turn off at slowdown distance from floor.
- **DL:** Turn on to move downward at leveling speed. Turn off to stop.
- **D:** Turn on with DL signal to run down at contract speed. Turn off at slowdown distance above floor.



Control signals are 110VAC and provided by elevator contractor

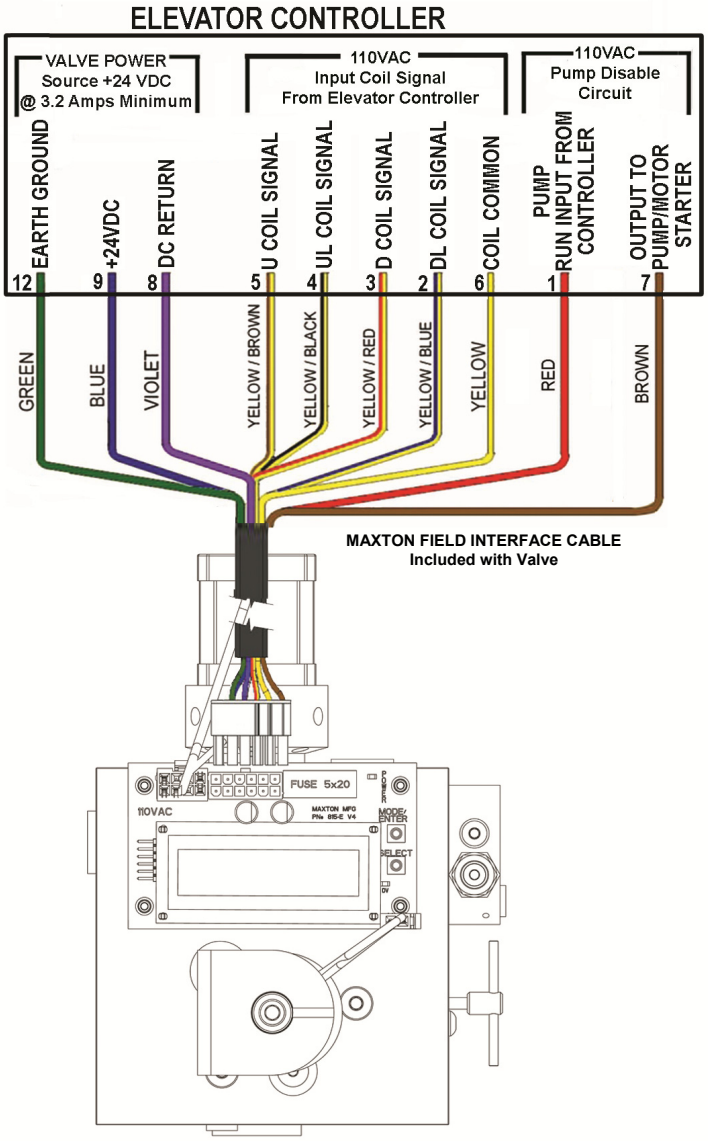
RECOMMENDED SLOWDOWN DISTANCE FOR HOISTWAY SWITCH INSTALLATION

2-1/2" for each 10 FPM of car speed or use slowdown distance table below:

Elevator Speed (ft./min.)	Slow down distance (in.)
30	8
35	9
40	10
45	11
50	12 ½
55	13 ¾
60	15

127 cm for each 1 m/s of car speed or use slowdown distance table below:

Elevator Speed (m/sec.)	Slow down distance (cm)
0.15	20.3
0.18	22.9
0.20	25.4
0.23	27.9
0.25	31.8
0.28	35.6
0.30	38.1



Warning:

Failure to correctly follow the recommended procedures may result in damage and/or a hazardous condition.

Verify all voltages before applying power. Incorrect voltages will damage the EMV10 control board. **Power supply must be regulated at +24VDC and Rated at 3.2 amps minimum**.

Interface to the EMV10 uses Maxton Field Interface Cable. Color coded wires are used to identify each electrical connection. Connect each wire to the elevator controller function as described below.

1. **PUMP RUN INPUT FROM CONTROLLER (110VAC input) (Red wire). Warning: Failure to use this circuit can result in a hazardous condition.** This wire should be connected in such a fashion that if a valve malfunction occurs, pump Operation is prohibited. The PUMP RUN INPUT FROM CONTROLLER wire is connected internally on the valve control board to the input side of a SSR (Solid State Relay). This wire should be connected to the elevator controller's 110VAC pump run signal.

7. **OUTPUT TO PUMP/MOTOR STARTER (output) (Brown wire). Warning: Failure to use this circuit can result in a hazardous condition.** This wire must be connected in such a fashion that if a valve malfunction occurs, pump operation is prohibited.
   The OUTPUT TO PUMP/MOTOR STARTER wire is connected internally on the valve control board to the output side of a SSR. This wire should be connected to the 110VAC pump/motor starter.

6. Coil Common (Yellow). Connect to the coil common signal (110VAC(N)).

2. DL Coil Signal (Yellow / Blue). Connect the 110VAC down leveling coil signal here.

3. D Coil Signal (Yellow / Red). Connect the 110VAC down high speed coil signal here.

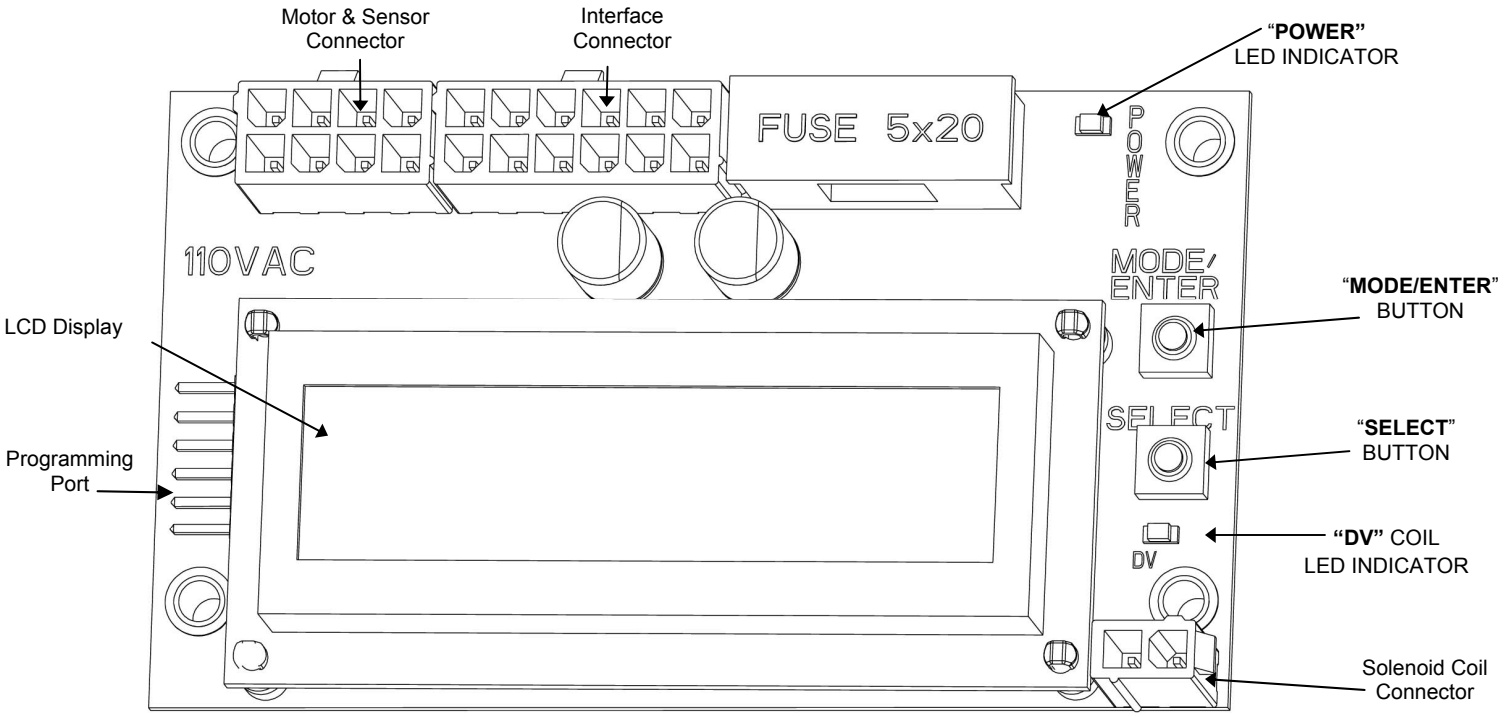
4. UL Coil Signal (Yellow / Black). Connect the 110VAC up leveling coil signal here.

5. U Coil Signal (Yellow / Brown). Connect the 110VAC up high speed coil signal here.

8. DC Return (Violet). Connect to the 24VDC power supply (negative) - return.

9. +24VDC @ 3.2A (Blue). Connect to a regulated +24VDC power supply, rated at a 3.2 amps minimum. This is the primary valve power source. The 24VDC power supply should be switched on / off by the elevators main power source.

12. Ground (Green). Connect to Earth ground.



VALVE SET UP

THE INFORMATION PRESENTED HEREIN IS FOR USE BY SKILLED HYDRAULIC ELEVATOR PROFESSIONALS

FACTORY SETTING: All valves are factory tested and set to the job specifications provided. Factory settings should only be changed if accurate car speed information is available to the technician.

NORMAL OPERATION MODE: Make sure all connectors are plugged in to the VCB (Valve Control Board). The green "POWER" indicator is on and there is no errors listed on the LCD display. These conditions indicate normal valve operation.

PRESSURE RELIEF ADJUSTMENT:

- Land car in pit and install pressure gauge in port "B".
- Register an up call with a fully loaded car, making note of pressure gauge reading.
- Cancel the up call.
- Close the manual shut off valve to the jack.
- Set the relief adjuster to the minimum pressure position. To do this turn the relief adjuster screw fully CW until seated. Then turn CCW 3 full turns.
- Register an up call, observe pressure gauge and turn the relief adjuster CW to increase the pressure gage reading. The final setting should be in accordance with state and local code requirements.
- Cancel the up call.
- Snugly tighten the relief adjuster nut.
- Register an up call to verify the pressure relief setting.
- Cancel the up call.
- Open the manual shut off valve to the jack.

VALVE SET UP:

- Register up and down calls to verify FLOW (high speed), leveling speed, acceleration, deceleration and stop rates.
- If necessary, use the MODE/ENTER button to navigate to the ride quality setting to select different ride quality (rate). Setting "0" (factory default) provides the softest ride quality (rate), setting "9" provides the hardest ride quality (rate).

MANUAL LOWERING (ML):

- ML is Twist style located on the right side of the valve.
- Turn ML OUT (CCW) to lower car when necessary. Manual lowering speed may vary with system pressure and jack size.

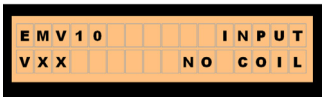
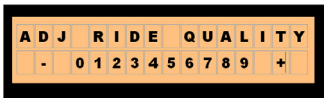
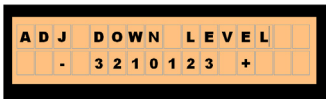
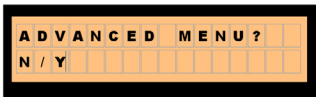
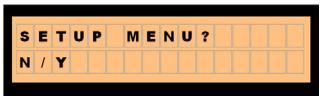
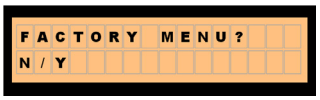
PROCEDURE FOR SETTING OVERSPEED FLOW WITH 11 AND 12 GPM WORKING FLOW:

- After completely setting up the valve including the down flow. With car at the bottom floor, turn the Relief (R) adjuster out (CCW) to stop.
- Make an up call. Car should not move. Turn the Relief adjuster slowly IN (CW) until the car moves then one more turn IN. Car should make normal up run and stop at the upper floor.
- Turn the Relief adjuster OUT (CCW) one turn. Make a down call. Car should be running down at speed faster than normal down run. Check car speed if it complies with the Codes, 110 to 140 % of normal down high speed. If not, turn the Relief adjuster OUT (CCW) for faster or IN (CW) for slower down high speed. Note the number of turns in this step.
- If an up run is needed, turn the Relief adjuster IN (CW) the same number of turn in Step 3.
- When the down high speed for overspeed condition is obtained, set the overspeed valve (or governor) as required.

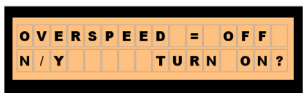
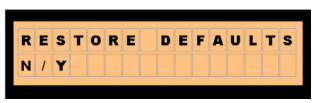
MAIN MENU

Notification

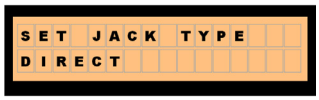
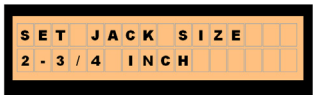
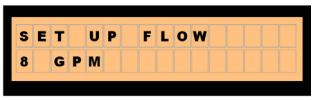
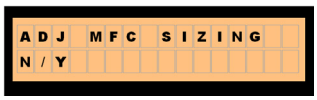
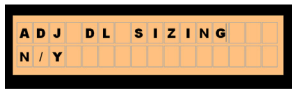
- **Press "MODE/ENTER" button to cycle through the menu**
- **Flashing cursor indicates current setting**

DISPLAY	FUNCTION	DESCRIPTION
	**Main Screen** (Run Mode)	Upon power up, the Main Screen will Display. Screen must be active for valve to operate in run mode. Screen displays active coil inputs during operation and software version. Inputs are U, UL, D and DL.
	**Ride Quality (Rate) Adjustment**	Press "SELECT" button to cycle through ten levels of Ride Quality Settings.
	Up Leveling Adjustment	Press "SELECT" button to cycle through +/- 3 fpm of adjustment in up leveling.
	**Down Leveling Adjustment**	Press "SELECT" button to cycle through +/- 3 fpm of adjustment in down leveling.
	**Advanced Menu** (OverSpeed, Error, Defaults)	Press "SELECT" button to cycle to "Y" (yes) and press the "MODE/ENTER" button to enter the "ADVANCED MENU". This menu allows you to enter Overspeed Mode, view Error History, Delete Error History and Restore Defaults
	**Setup Menu** (Jack, Flow, Sizing)	Press "SELECT" button to cycle to "Y" (yes) and press the "MODE/ENTER" button to enter the "SETUP MENU". This menu allows you to change the Jack Type, Jack Size, MFC Sizing, and Leveling Sizing.
	**Factory Menu** (Set Defaults, Software Reset) **PASSWORD REQUIRED**	Press "SELECT" button to cycle to "Y" (yes) and press the "MODE/ENTER" button to enter the "FACTORY MENU". This Menus allows you to Set the Defaults and Reset to Program Defaults.

ADVANCED MENU

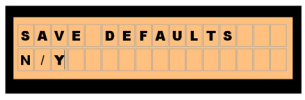
DISPLAY	FUNCTION	DESCRIPTION
	**Overspeed Mode** **110% - 140% of down flow value**	Press "SELECT" button to cycle to "Y" (yes) and press the "MODE/ENTER" button to enter the "OVERSPEED MODE" This function allows the user to perform an overspeed test enabling the valve to operate between 110% to 140% above the normal down flow setting in down direction. Return to the Main Menu (Run Mode) to perform test. You must cycle power or return to Overspeed Mode to turn off and return to normal operation ** Not applicable with a working flow setting of 11 or 12 GPM **
	View Error History	Press "SELECT" button to cycle to "Y" (yes) and press the "MODE/ENTER" button to view the error history. Valve will store up to 10 errors and will cycle through them automatically. Possible errors: MFC Motor or MFC Sensor Error.
	Delete Error History	Press "SELECT" button to cycle to "Y" (yes) and press the "MODE/ENTER" button to delete the error history. There will be a confirmation and the screen will automatically cycle to the next menu.
	**Restore Default Settings**	Press "SELECT" button to cycle to "Y" (yes) and press the "MODE/ENTER" button to restore default settings. This function will return the valve settings to when the original job specifications provided by the customer.

SETUP MENU

DISPLAY	FUNCTION	DESCRIPTION
	**Jack Type**	Press “SELECT” button to cycle through and select from two Jack Types, Roped or Direct
	**Jack Size**	Press “SELECT” button to cycle through and select from fourteen metric and standard jack sizes ranging from 1 1/2” - 4”.
	**Up Flow Adjustment**	Press “SELECT” button to cycle through and select from nineteen contract flow settings, ranging from 3 – 12 GPM.
	Down Flow Adjustment	Press “SELECT” button to cycle through and select from nineteen contract flow settings, ranging from 3 – 12 GPM.
	**MFC Sizing** (Only if instructed by Maxton tech support)	Press “SELECT” button to cycle to “Y” (yes) and press the “MODE/ENTER” button to enter the “MFC SIZING”. Register up call when prompted. Adjust size setting by pressing the “MODE/ENTER” button to increase sizing or “SELECT” button to decrease sizing until the car reaches 0.3fpm
	Up Leveling Sizing (Only as instructed by Maxton tech support)	Press “SELECT” button to cycle to “Y” (yes) and press the “MODE/ENTER” button to enter the “UL SIZING”. Register up call when prompted. Adjust size setting by pressing the “MODE/ENTER” button to increase sizing or “SELECT” button to decrease sizing until the car reaches 8.0fpm
	**Down Leveling Sizing** (Only as instructed by Maxton tech support)	Press “SELECT” button to cycle to “Y” (yes) and press the “MODE/ENTER” button to enter the “DL SIZING”. Register down call when prompted. Adjust size setting by pressing the “MODE/ENTER” button to increase sizing or “SELECT” button to decrease sizing until the car reaches 8.0fpm

FACTORY MENU

PASSWORD REQUIRED

DISPLAY	FUNCTION	DESCRIPTION
	**Set Customer Defaults** (Only as instructed by Maxton tech support)	Press “SELECT” button to cycle to “Y” (yes) and press the “MODE/ENTER” button to save the customer defaults.
	Reset Software (Only as instructed by Maxton tech support)	Press “SELECT” button to cycle to “Y” (yes) and press the “MODE/ENTER” button to reset all valve settings to software default.

TROUBLESHOOTING CHECK LIST – UP SECTION

The first section of the check list deals with the UP movement, while the second deals with the DOWN movement. Use the following reference materials in conjunction with the trouble shooting check list: Hydraulic Schematics, Operating Sequences, Setup Instructions, and Electronic Controller Status Code Indications.

SYMPTOM	CAUSE	CHECK	REF.
Up call registered but no up travel.	No power to VCB.	Check VCB POWER indication.	P6
	Pump not running.	Check pump disable circuit wiring	P5
Pump runs, car does not move.	Line shut-off valve	Check line shut-off valve open.	
	No UL Input signal to VCB.	Verify UL input signal.	P5 , 6
	No U and UL signals to VCB. LED's are off or dim.	Check for U, UL signals at elevator controller.	
		Check for a broken or loose field interface cable from elevator controller to VCB.	
	Relief pressure set too low	Check correct Relief pressure is set.	P6
	Clogged orifices, strainer.	Check for oil contamination.	P2
	Up Compensator Valve not closing.	Up Compensator Spool jammed. Up Compensator Spring broken. Call Maxton for Assistance	
Up Acceleration rough.	Ride Quality setting.	Change Ride Quality Setting.	P6 , 7
	Sizing position incorrect.	Call Maxton For Assistance	
	Rail and / or packing friction.	Check jack packing and guide shoes for excessive friction.	
Up high speed slow.	Low pump motor horsepower.	Check motor horsepower rating. Check line voltage.	
	Relief pressure set too low.	Check Relief pressure setting. Note: If the Relief pressure is too low, the down high speed will be faster than normal.	P6
	Pump output low.	Check pump specification.	
		Check pump inlet strainer.	
	Incorrect Flow setting.	Change Flow setting.	P6, 7
	Incorrect MFC sizing position.	Call Maxton For Assistance	
	Incorrect Jack size setting.	Change Jack size setting	P6, 7
Up Leveling Speed slow / Stall	Incorrect Leveling Speed setting.	Change Leveling Speed setting.	P6, 7
	Incorrect MFC sizing position.	Call Maxton For Assistance	
	Incorrect Jack size setting.	Change Jack size setting	P6, 7
	Coil Sequence wrong	Check controller for proper coil signal timing. (i.e. U and UL dropping then UL re-energizing)	
Car overshoots floor.	Up Leveling Speed too fast.	Change Up Leveling Speed setting.	P6, 7
	Ride Quality selection too soft.	Change Ride Quality Setting.	P6, 7
	Up flow setting higher then actual pump output.	Reset Flow setting.	P6, 7
	Incorrect Jack size setting.	Change Jack size setting.	P6, 7
	U and/or UL signals turn off late.	Check hoist way deceleration and stop switches. Correct slowdown distance, if necessary.	P4 , 6
Harsh Up Stop	Not enough pump time	Increase pump time. The pump should continue to run for about one second after the car stops.	P4

SYMPTOM	CAUSE	CHECK	REF.
Down call registered but no down travel.	No power to VCB.	Check VCB POWER indication	P6
		Check VCB Fuse	
	Line shut-off valve	Check line shut-off valve open.	
	Tripped pipe rupture valve	Check and reset pipe rupture valve.	
	D or DL signals to VCB missing.	Verify D, DL signals at elevator controller.	P5 , 6
		Check for a broken or loose field interface wire from elevator controller to VCB.	
	DV solenoid not energized	Check the solenoid LED for power to the coil. Physically pick up the coil (quickly put it back) to feel the magnetic field at the coil. Replace coil, if necessary.	P5 , 6
	MFC malfunction	Replace MFC, Call Maxton For Assistance	
Car slowly creeps down when down call registered	DV solenoid	Check voltage to solenoid coil.	P5 , 6
		Check that DV solenoid is energized.	
		Replace solenoid coil, if necessary.	
	Check Orifice PN#876 Undersized	Verify Orifice Dimension is .021	
	MFC malfunction	Replace MFC, Call Maxton For Assistance	
Down leak	Leak at jack or line	Close line shut-off valve. If car still drifts down,	
	Leak at DV solenoid	Check solenoid seat	P2
	Leak at Main Check Valve	Remove check seat and view for damage and/or debris, Call Maxton For Assistance	
	Manual Lowering Leaking	Turn ML (Manual Lowering) screw out (CCW) and then turn in (CW) fully to insure a good seat.	
Slow start	Rail and packing friction	Check jack packing and guide shoe tightness.	
	Ride Quality setting	Change Ride Quality Setting	P7
Harsh or bouncy down start	Air in hydraulic system	Bleed air from jack.	
	Rail and / or packing friction	Check jack packing and guide shoes for excessive friction.	
Abrupt down start	Shuttle stuck	Call Maxton For Assistance	
	Incorrect MFC sizing position	Call Maxton For Assistance	
Down high speed too slow	Incorrect Flow setting	Reset Flow setting.	P6 , 7
Down speed not regulated (too fast)	Shuttle stuck	Make a full up run. Wait for 10 seconds, then make a down run. If problem repeats Call Maxton For Assistance	
	Clogged orifices or strainer	Check for oil contamination.	P2
Car overshoots floor	D and DL signal from elevator controller	Check hoist way deceleration and stop switches. Adjust slowdown distance, if necessary.	P4
	Down Leveling Speed too fast	Change Down Leveling Speed setting.	P6 , 7
	Rate profile selection too soft	Change Ride Quality setting.	P6 , 14
Down leveling slow or stalled.	Incorrect Down Leveling setting	Change Down Leveling setting.	P6 , 7
	Incorrect Jack size setting	Change Jack size setting.	
Down stop too soft or hard.	Rate profile selection	Change Ride Quality setting.	P6 , 7
	Incorrect Jack size setting	Change Jack size setting	

SYMPTOM	CAUSE	CHECK	REF.
After a run is complete car moves down 2-8" during pressure relief routine.	Closing Orifice Clogged	Remove closing orifice and check for debris.	2
	Check Piston not closed	Call Maxton For Assistance	
Erratic up and down movement (Stop and Go)	Sensor unable to read encoder disk	Remove sealant and check sensor cavity for oil. Clean with contact cleaner and dry with compressed air	
Up high speed bogs down motor, down leak present	Check piston Stuck	Call Maxton For Assistance	
Down High Speed fluctuation, Excessive noise on down run	Pump Shuttle Stuck	Call Maxton For Assistance	

The valve controller program incorporates self diagnostic routines designed to identify conditions that can result in incorrect or abnormal valve operation. The diagnostic routines have the ability to auto-correct most conditions that may be encountered.

Error History:
If an error condition occurs the VCB will momentarily stop car movement, interrupt the pump operation and display an error. If possible clear the cause of the condition and automatically return to normal operation. If experiencing large numbers of error conditions, check the cables for loose connections and proper power to the VCB. To determine if an error condition has occurred navigate to the Advanced Menu where there is a view history mode. This mode once entered will display a number of errors recorded up to ten and then display those errors automatically at a three second interval.

Erase Error History:
To erase error history, navigate to the Delete History in the Advanced Menu. Select yes and there will be a confirmation screen notifying that the operation is complete.

Note 2: <u>For proper operation the elevator pump operation must be interrupted under various conditions</u>.
Therefore be sure to utilize the **PUMP DISABLE CIRCUITS** in the valve installation as described on pg. 5

Motor Failure	MFC motor position error	MFC MOTOR not moving	Check Motor and Sensor for damage. Replace if necessary
		MFC sensor damaged or blocked	Check Motor and Sensor for damage. Replace if necessary
Sensor Failure	MFC motor position error	MFC MOTOR not moving	Check Motor and Sensor for damage. Replace if necessary
		MFC sensor damaged or blocked	Check Motor and Sensor for damage. Replace if necessary

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